

**REMARKS**

Applicant appreciates the Examiner's thorough consideration provided the present application. Claims 21, 23-31, 33-36 and 38-40 are now present in the application. Claims 21, 24, 27, 31 and 35 have been amended. Claims 22, 32 and 37 have been cancelled in this Reply. Claims 21, 24, 27, 31 and 35 are independent. Reconsideration of this application, as amended, is respectfully requested.

**Information Disclosure Citation**

Applicant has submitted the references supplied with the Information Disclosure Statement filed on March 23, 2007 for consideration by the Examiner. However, Applicant has not received an initialed copy of the PTO-1449 form indicating that the references have been considered by the Examiner. The Examiner is courteously requested to provide Applicant with an initialed copy of the PTO-1449 form filed therewith with the next official communication.

**Claim Rejections Under 35 U.S.C. §§ 102 & 103**

Claims 21-23, 27, 28, 31 and 35-38 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Takashi, JP 2001-0274096. Claims 24-26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Takashi. Claims 29, 30, 33, 34 and 40 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Takashi in view of Koide, U.S. Patent Application Publication No. US 2001/0048112. Claim 39 stands rejected under 35 U.S.C. § 103(a) as being

unpatentable over Takashi in view of Yuasa, U.S. Patent No. 6,017,774. These rejections are respectfully traversed.

Complete discussions of the Examiner's rejections are set forth in the Office Action, and are not being repeated here.

Without conceding to the propriety of the Examiner's rejections, but merely to timely advance the prosecution of the application, as the Examiner will note, claims 21, 24, 27, 31 and 35 have been amended.

### **Claims 21, 31 and 35**

Independent claim 21, 31 and 35 now recite a combination of elements including "the buffer layer has a triple-structured  $Al_yIn_xGa_{1-(x+y)}N/In_xGa_{1-x}N/GaN$  laminated (where  $0 < x \leq 1$ ,  $0 \leq y \leq 1$ )." Applicant respectfully submits that the above combination of elements set forth in claims 21, 31 and 35 are not disclosed or suggested by the references relied on by the Examiner.

The Examiner referred to the combination of Takashi's buffer (AlGaN) layer 2, an undoped GaN layer 3, and an InGaN/AlGaN layer 30 as the buffer layer of the claimed invention. As shown in FIG. 1 and Table 1 of Takashi, this reference simply discloses that the buffer layer is AlGaN(layer 2)/GaN (layer 3)/InGaN/AlGaN (layer 30). However, Takashi fails to teach or suggest that the buffer layer has a laminated triple-structured  $AlIn_xGa_{1-(x+y)}N/In_xGa_{1-x}N/GaN$  layer. Therefore, Takashi fails to teach "the buffer layer has a triple-structured  $AlIn_xGa_{1-(x+y)}N/In_xGa_{1-x}N/GaN$  laminated (where  $0 < x \leq 1$ ,  $0 \leq y \leq 1$ )" as recited in amended claims 21, 31 and 35.

### Claims 24 and 27

Independent claim 24 now recites a combination of elements including “ $\text{Al}_y\text{Ga}_{1-y}\text{N}/\text{GaN}$  short period superlattice (SPS) layers on the buffer layer in a sandwich structure of upper and lower layers having an indium-doped GaN layer interposed therebetween (where  $0 < y \leq 1$ ).”

Independent claim 27 now recites a combination of elements including “ $\text{Al}_y\text{Ga}_{1-y}\text{N}/\text{GaN}$  short period superlattice (SPS) layers on the indium-doped GaN layer, in a sandwich structure of upper and lower layers having the indium-doped GaN layer interposed therebetween (where  $0 < y \leq 1$ ).”

Applicant respectfully submits that the above combinations of elements set forth in claims 24 and 27 are not disclosed or suggested by the references relied on by the Examiner.

The Examiner referred to the combination of Takashi’s super-lattice defect reduction layers 40 and 50 and the undoped GaN layer 5 as the  $\text{Al}_y\text{Ga}_{1-y}\text{N}/\text{GaN}$  short period superlattice (SPS) of the claimed invention. As shown in FIG. 1, Takashi’s sandwich structure includes the super-lattice defect reduction layers 40 and 50 as the upper and lower layers, and an *undoped GaN layer 5 interposed between* the super-lattice defect reduction layers 40 and 50. However, Takashi nowhere discloses any *indium-doped GaN layer interposed between* the super-lattice defect reduction layers 40 and 50. Therefore, Takashi fails to teach “ $\text{Al}_y\text{Ga}_{1-y}\text{N}/\text{GaN}$  short period superlattice (SPS) layers on the buffer layer in a sandwich structure of upper and lower layers having an *indium-doped GaN layer interposed therebetween* (where  $0 < y \leq 1$ )” as recited in amended claim 24 and “ $\text{Al}_y\text{Ga}_{1-y}\text{N}/\text{GaN}$  short period superlattice (SPS) layers on the indium-

doped GaN layer, in a sandwich structure of upper and lower layers having *the indium-doped GaN layer interposed therebetween* (where  $0 < y \leq 1$ )" as recited in amended claim 27.

With regard to the Examiner's reliance on the secondary references, these references have only been relied on for their teachings related to some dependent claims. These references also fail to disclose the above combinations of elements and steps as set forth in amended independent claims 21, 24, 27, 31 and 35. Accordingly, these references fail to cure the deficiencies of Takashi.

In addition, claims 23, 25, 26, 28-30, 33, 34, 36 and 38-40 depend, either directly or indirectly, from new independent claims 21, 24, 27, 31 and 35, and are therefore allowable based on their respective dependence from new independent claim 21, 24, 27, 31 and 35, which are believed to be allowable.

In view of the above remarks, Applicant respectfully submits that claims 21, 23-31, 33-36 and 38-40 clearly define the present invention over the references relied on by the Examiner. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103 are respectfully requested.

### **Additional Cited References**

Since the remaining patents cited by the Examiner have not been utilized to reject the claims, but rather to merely show the state of the art, no further comments are necessary with respect thereto.

### **CONCLUSION**

All the stated grounds of rejection have been properly traversed and/or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently pending rejections and that they be withdrawn.

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

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Amendment dated August 30, 2007  
Reply to Office Action of June 1, 2007

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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Dated: August 30, 2007

Respectfully submitted,

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